

Date: Tue, 31 Aug 93 04:30:16 PDT
From: Ham-Ant Mailing List and Newsgroup <ham-ant@ucsd.edu>
Errors-To: Ham-Ant-Errors@UCSD.Edu
Reply-To: Ham-Ant@UCSD.Edu
Precedence: Bulk
Subject: Ham-Ant Digest V93 #32
To: Ham-Ant

Ham-Ant Digest Tue, 31 Aug 93 Volume 93 : Issue 32

Today's Topics:

 A few intersting ants
 Cheap 2 meter 4-el Yagi (\$5)
 R7 Info Needed (2 msgs)
 SWR Meters (2 msgs)

Send Replies or notes for publication to: <Ham-Ant@UCSD.Edu>
Send subscription requests to: <Ham-Ant-REQUEST@UCSD.Edu>
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Ant Digest are available
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-ant".

We trust that readers are intelligent enough to realize that all text
herein consists of personal comments and does not represent the official
policies or positions of any party. Your mileage may vary. So there.

Date: Mon, 30 Aug 1993 18:11:58 GMT
From: sdd.hp.com!usc!howland.reston.ans.net!vixen.cso.uiuc.edu!uchinews!att-out!
cbfsb!cbnews!bigtop!longs!n2ic@network.ucsd.edu
Subject: A few intersting ants
To: ham-ant@ucsd.edu

Date: 30 Aug 1993 13:10:51 -0400
From: pravda.sdsc.edu!news.cerf.net!usc!howland.reston.ans.net!gatech!destroyer!
vela.acs.oakland.edu!vela.acs.oakland.edu!swood@network.ucsd.edu
Subject: Cheap 2 meter 4-el Yagi (\$5)
To: ham-ant@ucsd.edu

I once made a 4 element yagi for 2 meters and it has been cooking for
me for close to 5 years and running for an initial cost of less than \$5

I bought a varnished broomstick at the hardware for a buck and a roll of aluminum grounding material from Radioshack for about \$2.50.

I took a trip to school and pulled an old version of William Orr's Ham Radio Manual off the shelf to get some dimensions for elements and element spacing.

I went with a folded dipole for a driven element using a couple of pieces of scrap plastic (with holes drilled in it) as spacers. I then cut my reflector and two directors from the same RS grounding wire. I grabbed some extra coax and a couple of alligator clips, and with the help of the radio manual built a coaxial balun out of a 27.5" piece of coax.

I of course left the ends of the folded dipole extra long in the form of tuning stubs at the feed point of the antenna.

Using the alligator clips, I was able to tune the antenna down to about 1.3 to 1 at the center of the FM 2 meter band area with about 1.8-2.1 to 1 at the extreme ends of the band.

I have not had a chance to check it for front to back and front to side, but it seems to have been doing me rather well with significant front to back selectivity for getting in the distant stations, yet still capable to hit the local repeaters off the side without need to rotate.

If anyone would like to see my plans, I can pump them into the computer again and send you a copy....

swood

WQ8B - Scott

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+-----+
|               Hunting:  The thrill is not in the kill....   |
|               ***** SHIT DIES! *****                  |
+-----+
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Date: 30 Aug 93 18:02:05 GMT

From: ogicse!uwm.edu!cs.utexas.edu!sdd.hp.com!col.hp.com!fc.hp.com!

jayk@network.ucsd.edu

Subject: R7 Info Needed

To: ham-ant@ucsd.edu

: I mounted mine to my chimney (3 flu - big jobbie) with custom made
: stainless steel chimney mounts. The Rat Shack ones were too flimsey

: looking.

I mounted my R5 to a single chimney with the Radio Shack mounts.
Unfortunately the mounts were stronger than the chimney.....

73, Jay K0GU jayk@fc.hp.com

Date: 30 Aug 1993 15:30:02 GMT
From: dog.ee.lbl.gov!agate!howland.reston.ans.net!noc.near.net!jericho.mc.com!
fugu!levine@network.ucsd.edu
Subject: R7 Info Needed
To: ham-ant@ucsd.edu

In article 20515@smoke.brl.mil, abc@brl.mil (Brinton Cooper) writes:
>I'm contemplating the purchase of a CushCraft R7 antenna and would
>appreciate knowing your experiences. In particular, I'd like to know:
>
>
> 1. how/where you mounted it;
> 2. your assessment of its performance, including VSWR, pattern,
>and subjective factors;
> 3. how much room it requires;
> 4. if you recommend it and, if not, why not;
> 5. any other relevant thing.
>
>Thanks for your time. Please post or send e-mail as convenient for you.
>
>_Brint
>
>INTERNET: abc@arl.army.mil ab.cooper@compmail.com
> cooper@udel.edu ab.cooper@ieee.com
>--
>_Brinton Cooper
><abc@brl.mil>, <cooper@udel.edu>, or <ab.cooper@compmail.com>

I mounted mine to my chimney (3 flu - big jobbie) with custom made stainless steel chimney mounts. The Rat Shack ones were too flimsy looking.

My SWR plots are very close to the literature. 20m 2:1 bandwidth is 260khz, 15m 2:1 bandwidth is about 350 khz and 10m 2:1 is over 1mhz. 40m 2:1 is 125khz, 30m 2:1 is 40khz. 17 & 12 are the whole band.

I have worked 218 countries on R7 & R5. It is the best compromise antenna on the market. It took some tweaking and I did need to replace 1 trap in its lifetime.

It is mounted in the clear by 30' or so. It needs the space. I did need to add 8' of coax to my run (about 50-60') to tweak the 2:1 bandwidth on 20m. Without my 8' jumper, the 2:1 bandwidth was only 150khz. I havent figured this out yet, it had no affect on any other band (10,12,15,17,30,or 40)

It withstood the 80mph winds we had during last March's blizzard.

I recently put up a A4S beam and the beam is about 5-6 S units better on Rx and Tx.

This is perfectly consistent with the gain figures published and by the experience of most hams with verticals vs. beams.

I would reccomend it for limited space hams.

73 Bob KD1GG

Date: Mon, 30 Aug 1993 09:30:22 GMT
From: dog.ee.lbl.gov!agate!howland.reston.ans.net!gatech!kd4nc!ke4zv!
gary@network.ucsd.edu
Subject: SWR Meters
To: ham-ant@ucsd.edu

Note I've edited down the newsgroups line, no point in hitting every group with this.

In article <CCE94p.H6z@hpcvsnz.cv.hp.com> tomb@lsid.hp.com (Tom Bruhns) writes:

>Gary Coffman (gary@ke4zv.uucp) wrote:

>

>: Now suppose the line is *not* terminated in a resistor of the line's
>: characteristic impedance. Let's first look at two extreme cases. If
>: the line is *open*, then current will be zero and voltage will be
>: maximum, a very high impedance point. Note that the voltage and
>: current are now out of phase by 90 degrees. When the voltage collapses,

>

>Poppycock. The instantaneous net voltage and current on a line at any
>point are the vector sum of the voltage and current of a forward and
>a reverse travelling wave. For each of those two, the ratio of
>voltage to current is the line impedance. If you do the measurement
>at a single frequency, and if the line impedance is real (no reactive
>component, purely resistive), the current and voltage will be
>exactly in phase. If you could _truely_ open-circuit an end of the
>line so there is _zero_ current there, then you can't say the voltage
>and current are 90 degrees out of phase at that point, because the
>current there is at all points in time _zero_. If there's a 90 degree
>phase shift between voltage and current, it's because you have put a

>purely reactive load at that point, not a true open circuit. Period.

If you'll recall the part of the post previous to what you quoted, you'll note that I'm describing the behavior with a *pulse* of RF down the line from the generator. That's a common way to describe transmission line behavior found in many books on the subject. Therefore, there isn't yet a reverse wave. Since this is a snapshot and not steady state, I can say that the current is at the zero axis while the voltage is 90 degrees away at the voltage peak. When the voltage peak collapses to the zero axis 90 degrees later, it will induce the reverse current into the line. The open line is indeed a pure reactance, in this case a capacitance.

>: Now this would all be pretty academic if we couldn't separate
>: V_f and V_r so we could measure them. Various bridge type circuits
>: can be used to separate the two wave components by taking advantage
>: of non-reciprocal properties of the bridge circuit. We can also
>: take advantage of the properties of travelling waves in the monimatch
>: to do the same thing. It's difficult to show how to build a VSWR
>: meter without drawings, so I'll refer you to the instrument on
>: page 27-11 of The ARRL Antenna Book for a line section that will
>: work at VHF/UHF and that can be made out of ordinary copper plumbing
>: fixtures.

>

>Gary earlier in the posting noted that an SWR bridge measures VSWR or
>ISWR rather than SWR. I take some issue with this. I claim that
>almost all bridges that are physically a small fraction of a wavelength
>make their measurement by ratioing current and voltage at a point in
>the line; a true VSWR meter would measure the RMS voltage at at least
>two places on the line (separated, for example, by 1/4 wavelength in
>the line), but this is NOT the way these meters work. Whether the
>voltage is measured with a transformer, a capacitive divider, or a
>resistive divider, it's the voltage at a _single_ point in the line.
>And at that same point, the current is measured, with a current
>transformer, the voltage drop through a resistor, or as an inductive
>pickup that's also a capacitive pickup monitoring the voltage:
>that is, the parallel wire.

If you'll consult page 25-10 of the ARRL Handbook (91), you'll find a circuit and functional description of a "reflectometer" bridge. The bridge is only balanced in one direction, so it can separate the forward and reflected voltage components at that point by taking advantage of the asymmetry of the circuit to voltages entering at different points. The forward voltage is across the bridge and is balanced out while the reverse voltage enters across Rx and is inherently unbalanced with respect to the meter movement. Measuring the RMS voltage at two arbitrary points on the line will not give a VSWR reading for the line. Only if you slide the probe along and find the max and min

points on the line, different places for different frequencies or different line lengths, will you be able to calculate the VSWR of the line. This was sometimes done at microwave frequencies, but is terribly ungainly at lower frequencies where the slotted line has to be quite long. I might also note that any voltage measuring meter is actually a current measuring device taking advantage of an impedance across which the voltage drives a current that activates the movement. That's irrelevant as long as the impedance doesn't load the point being measured enough to exceed the practical accuracy of the instrument. Since voltage and current in a given wave are in phase along the line, which one you measure doesn't matter.

>A forward wave will have $v/i=z$, where i is measured as positive if
>flowing toward the load; a reverse wave will have $v/i=z$, where i is
>measured as positive is flowing away from the load. The SWR meter
>works by expecting $v-iz=0$ for i measured positive toward the load;
>built in to the meter is an assumption about z ! The meter does NOT
>know the z of the line you are measuring, so if you use a 50 ohm
>meter on a 75 ohm matched line, it will tell you incorrectly that
>the line has an SWR greater than 1:1.

Actually it will tell you *correctly* that the SWR is other than 1:1 because you've introduced a mismatched line segment, the meter, into the system. That's only relevant for a thru-line type power meter. It isn't important for a bridge type meter, however, since you have to adjust it for forward balance in any event and the generator is still going to see only the Z_0 of the line because the other resistances of the bridge have been balanced out. It will change the *absolute* wave readings, but that's again irrelevant in the bridge meter because only the ratio of the forward and reflected readings matter. This isn't a power meter, only a reflectometer. The instrument on page 27-11 of The Antenna Book *is* a thru-line section, however, and the Z_0 of the line segment is relevant. It must be the same impedance as the line being measured, or you will have introduced a mismatch that will show up in the readings. Note that I'm not assuming a meter movement calibrated directly in SWR. *That* will change with frequency in either the thru-line or the bridge circuits. That's why you have different slugs for different frequency ranges with a thru-line meter, and a "set" pot for bridge circuits. But you can always use the *ratio* of the forward and reverse readings to determine SWR.

Gary

--

Gary Coffman KE4ZV	"If 10% is good enough	gatech!wa4mei!ke4zv!gary
Destructive Testing Systems	for Jesus, it's good	uunet!rsiatl!ke4zv!gary
534 Shannon Way	enough for Uncle Sam."	emory!kd4nc!ke4zv!gary

Lawrenceville, GA 30244 | -Ray Stevens |

Date: 31 Aug 93 00:20:18 GMT
From: ogicse!emory!wa4mei!ke4zv!gary@network.ucsd.edu
Subject: SWR Meters
To: ham-ant@ucsd.edu

In article <CCL275.Lu4@hpcvsnz.cv.hp.com> tomb@lsid.hp.com (Tom Bruhns) writes:
>Gary Coffman (gary@ke4zv.uucp) wrote:
>: In article <CCE94p.H6z@hpcvsnz.cv.hp.com> tomb@lsid.hp.com (Tom Bruhns) writes:
>: >Gary Coffman (gary@ke4zv.uucp) wrote:
>
><< Lots of stuff deleted on both sides >>
>
>: If you'll recall the part of the post previous to what you quoted,
>: you'll note that I'm describing the behavior with a *pulse* of RF
>: down the line from the generator. That's a common way to describe
>: transmission line behavior found in many books on the subject.
>: Therefore, there isn't yet a reverse wave. Since this is a snapshot
>: and not steady state, I can say that the current is at the zero
>: axis while the voltage is 90 degrees away at the voltage peak.
>: When the voltage peak collapses to the zero axis 90 degrees later,
>: it will induce the reverse current into the line. The open line
>: is indeed a pure reactance, in this case a capacitance.
>
>I thought of posting an all-too-serious reply to all this, but
>decided it isn't worth the effort: it's not a valid starting point
>for discussing SWR measurement. I did look up Gary's posting
>which I had originally quoted and found no reference in the area
>previous to what I quoted to a "pulse of RF". Indeed, on rereading,
>it looked like he was talking about steady-state.

Well here's the relevant part of the post.

A transmission line has a characteristic impedance. That's the impedance
a generator would see if it impressed a pulse on an infinitely long line
^^^^^

segment. This impedance exists because of the distributed inductance and
capacitance of the line. Since that's purely reactive, no power is dissipated
in the line, but since the line is infinitely long, it appears to the
generator that the power has been dissipated in the "load" presented by
the line. If we replace the infinite line segment with a finite length
line and terminate it in a resistor of the line's characteristic impedance,
from the generator's point of view nothing will have changed. That's called
a perfectly matched line. As far as the generator is concerned, it's looking
directly into a resistor of the line's characteristic impedance.

Gary

--

Gary Coffman KE4ZV	"If 10% is good enough	gatech!wa4mei!ke4zv!gary
Destructive Testing Systems	for Jesus, it's good	uunet!rsiatl!ke4zv!gary
534 Shannon Way	enough for Uncle Sam."	emory!kd4nc!ke4zv!gary
Lawrenceville, GA 30244	-Ray Stevens	

Date: (null)

From: (null)

A half square is simply 2/3 of a bobtail curtain (3 1/4 wavelength verticals). Both antennas are essentially phased verticals, with the horizontal wire providing the correct phase relationship between the verticals. Not a bad idea, in theory. I have been playing with modeling bobtail curtains using MN (a commercial Mininec derivative). I have been very disappointed with the deterioration in performance when the vertical elements are placed in proximity to other vertical, conductive objects, such as the tower(s) used to support the antenna. For an 80 meter bobtail curtain, placing either end 30 feet from a supporting tower significantly degrades the antenna. 10 feet from the tower makes it a worthless antenna.

Steve, N2IC/0

End of Ham-Ant Digest V93 #32
